

*Northern plateau.*—Boisé City, Idaho, 25th.

*California.*—Los Angeles and Princetown, 4th; Sacramento, 9th; San Francisco and Oakland, 25th.

The following instances of damage by lightning have been reported:

Indianapolis, Indiana: the electrical display accompanying the thunder storm of the 11th was very unusual. A building in this city was damaged by the lightning and several persons were stunned.

Austin, Texas: during a thunder storm on the 17th, several objects in this city were struck by lightning.

Montgomery, Alabama: the telephone wires in this city were damaged by lightning during the thunder storm on the night of the 23-24th.

### OPTICAL PHENOMENA.

#### SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates:

*New England.*—2d to 8th, 10th, 11th, 13th to 15th, 17th to 19th, 21st to 25th, 29th to 31st.

*Middle Atlantic states.*—1st, 10th to 12th, 16th, 18th, 22d, 25th, 28th.

*South Atlantic states.*—3d, 4th, 9th, 10th, 12th, 17th to 20th, 22d, 24th, 26th to 28th.

*Florida peninsula.*—Archer, 24th.

*Eastern Gulf states.*—18th, 20th, 24th.

*Western Gulf states.*—3d, 10th, 16th, 18th, 21st, 22d, 25th, 27th, 30th.

*Tennessee and Ohio valley.*—4th, 9th, 12th, 16th, 17th, 22d to 24th, 26th to 28th, 31st.

*Lower lake region.*—1st to 3d, 5th, 6th, 10th, 13th, 14th, 16th, 21st, 22d, 24th.

*Upper lake region.*—1st, 4th, 6th, 8th, 10th, 14th, 16th, 20th, 25th, 26th, 28th, 30th.

*Upper Mississippi valley.*—2d, 3d, 6th, 7th, 12th to 16th, 21st to 23d, 27th, 29th.

*Missouri valley.*—5th, 8th, 10th, 11th, 13th, 16th, 22d.

*Middle slope.*—11th, 14th, 19th, 20th, 23d, 30th.

*Southern slope.*—Fort Stockton, Texas, 19th.

*Middle plateau.*—Salt Lake City, Utah, 13th; Nephi, Utah, 22d; Carson City, Nevada, 29th.

*Northern plateau.*—Boisé City, Idaho, 8th, 13th, 18th.

*North Pacific coast region.*—Roseburg, Oregon, 13th; Albany, Oregon, 29th, 31st; Bainbridge Island, Washington Territory, 29th, 30th.

*California.*—San Francisco, 1st, 2d, 3d, 7th, 12th, 17th, 18th, 21st, 25th; Fall Brook, 1st, 11th, 20th; Los Angeles and Oakland, 21st.

#### LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

*New England.*—1st, 3d to 6th, 10th to 13th, 17th, 19th.

*Middle Atlantic states.*—1st, 2d, 4th, 6th, 8th, 10th to 12th, 25th, 31st.

*South Atlantic states.*—1st, 6th, 8th to 11th.

*Florida peninsula.*—3d, 5th, 6th, 10th, 12th to 14th.

*Eastern Gulf states.*—2d, 5th, 9th to 11th.

*Western Gulf states.*—4th to 6th, 9th to 13th, 30th, 31st.

*Rio Grande valley.*—Rio Grande City, Texas, 31st.

*Tennessee and Ohio valley.*—4th, 5th, 9th, 10th, 12th, 13th, 16th, 22d, 30th, 31st.

*Lower lake region.*—4th, 6th, 10th, 13th.

*Upper lake region.*—1st, 4th to 7th, 9th, 12th, 13th, 30th.

*Extreme northwest.*—3d to 6th, 11th.

*Upper Mississippi valley.*—2d, 3d, 5th to 9th, 14th, 15th.

*Missouri valley.*—4th to 6th, 8th to 12th, 30th.

*Northern slope.*—5th to 9th, 12th.

*Middle slope.*—Fort Elliott, Texas, 5th; Yates Centre, Kansas, and Red Willow, Nebraska, 9th.

*Southern slope.*—Fort Stockton, Texas, 3d, 7th; Fort Davis, Texas, 3d, 5th, 8th.

*Southern plateau.*—Wickenburg, Arizona, and El Paso, Texas, 9th; Yuma, Arizona, 1st, 13th, 14th, 21st.

*Middle plateau.*—Nephi, Utah, 11th; Salt Lake City, Utah, 13th; Carson City, Nevada, 12th, 31st.

*Northern plateau.*—Lewiston, Idaho, 4th; Spokane Falls, Washington Territory, 7th, 10th, 11th.

*North Pacific coast region.*—1st, 3d, 7th to 10th, 12th, 13th.

*California.*—Fall Brook, 1st; San Diego, 1st, 3d; Los Angeles, 12th.

#### MIRAGE.

Vermillion, Dakota, 12th.

Webster, Dakota, 9th.

Manistique, Michigan, 28th.

Genoa, Nebraska, 9th.

Indianola, Texas, 2d, 13th.

Pretty Prairie, Kansas, 9th, 12th, 26th.

Prof. Cuthbert P. Conrad, of Fayetteville, Arkansas, furnishes the following report:

On the evening of February 26, 1884, a phenomenon known locally as "weather lights" was the precursor of a violent snow storm. I have watched these "weather lights" in this locality for four years, and, while I have lived in five states east of the Alleghanies, have never witnessed similar phenomena elsewhere. The appearance is that of rosy red to white light appearing above the horizon, 5°, 10°, and even 30°, and all the way from northeast around to southwest—sometimes only in the northwest (the most frequent quarter); sometimes first in the northeast, fading out and appearing in northwest, west, or southwest.

These lights invariably precede a change in weather—either rain or snow (*i. e.*, a change invariably follows), but I have not been able to fix upon any definite interval of time.

The Chief Signal Officer desires to state that if others have observed similar phenomena, the reports of such observations are desirable.

#### MISCELLANEOUS PHENOMENA.

Concerning the phenomenal appearance of the sky at sunrise and sunset, which has been observed for several months past, the following reports for March have been received.

*Alabama.*—Red sunsets with afterglow were noticed at Auburn, Lee county, and at Tusculumbia, Colbert county, on the 24th and 25th.

*Arkansas.*—Lead Hill, Boone county, 31st: the red sky at sunrise and sunset has nearly disappeared; a faint display was observed on the morning of the 3d and on the evening of the 25th; on the 2d, 3d, 9th, 11th, and 12th, only a white glare was noticed.

*California.*—Hydesville, Humboldt county: during March, the unusual colors of the sky were only observed before sunrise and on the morning of the 3d, and on the evening of the 14th.

*Dakota.*—Webster, Day county: the twilights observed during March were not so bright as those of February, with the exception of the display of the 13th, which was quite brilliant.

*Florida.*—Limona, Hillsborough county: red sunrise on the 3d.

Archer, Alachua county: red sunsets on the 2d, 15th, 26th; red sunrise on the 16th.

*Georgia.*—Forsyth, Monroe county: red sunsets 20th, 21st, 26th, 28th.

*Indiana.*—Vevay, Switzerland county: orange-colored sunrise on the 27th.

*Iowa.*—Humboldt, Humboldt county: red sunsets on the 3d, 13th, and 14th.

*Kansas.*—Wellington, Sumner county, 31st: the phenomenal sunset afterglow was observed on all clear evenings during the month, its brilliancy having decreased to a great extent.

Sherlock, Finney county, 31st: the glow at sunrise and sunset was observed several times during the month, but the displays were fainter than those of November and December.

Allison, Decatur county: the glows at sunrise and sunset, observed during March, were less conspicuous than those seen in the previous months.

**Nebraska.**—Clear Creek, Saunders county: red sunsets, 1st, 26th.

**New Hampshire.**—Mount Washington: brilliant sunsets on the 1st, 18th, and 25th; brilliant sunrise on the 26th.

**New York.**—Mountainville, Orange county: brilliant sunrise on the 1st; red glow at sunset on the 3d.

**North Carolina.**—Brevard, Transylvania county: brilliant twilights on the 20th, 21st, 26th, 28th.

**Ohio.**—Wauseon, Fulton county: bright sunrises on 4th, 10th, 13th, 15th, 16th, 27th, 30th; bright sunsets 4th, 5th, 12th, 23d, 27th, 29th.

**Pennsylvania.**—Leetsdale, Alleghany county: red sunsets 3d and 4th.

**Tennessee.**—Sunset glows were observed at Grief, Bradley county, from the 24th to 31st; at Hardison's Mills, Maury county, on the 1st, 23d, 25th, 26th, 28th, and 29th; at Bolivar, Hardeman county, and Centerville, Hickman county, on all clear days; at Trenton, Gibson county, 20th and 25th; at Manchester, Coffee county, on 25th, 26th, and 28th; at Smithville, De Kalb county, on 24th, 27th, and 29th; at Nashville, on 24th and 26th.

**Texas.**—Cleburne, Johnson county: red sunrise 26th.

**Wisconsin.**—Wausau, Marathon county: brilliant sunset on the 23d, similar in appearance to those seen during September, 1883.

#### SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for March, 1884:

Date— Mch., 1884.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 10 a. m.							0	45	Broad areas of faculae. Small spots abundant. Faculae abundant. Faculae and small spots abundant. Do.
2, 5 p. m.	2	3	1	1	2	3	7	45	
3, 4 p. m.	1	10	0	0	0	0	7	45	
4, 10 a. m.	0	0	0	0	0	0	8	55	
5, 9 a. m.	0	0	1	5	0	0	7	50	
10, 9 a. m.	4	30					8	65	
13, 2 p. m.	2	20					8	80	
15, 4 p. m.	0	5	1	10	0	0	7	75	
16, 10 a. m.	1	2	2	5	0	0	0	70	
18, 11 a. m.	2	6	1	5	2	6	7	50	
21, 12 m.	1	2			1	2	0	35	Broad areas of faculae. Small spots abundant. Faculae abundant. Faculae and small spots abundant. Do.
22, 9 a. m.	1	5	0	0	0	3	7	40	
23, 6 p. m.	0	0	0	0	0	0	0	35	
24, 3 p. m.	1	7	1	2	1	7	6	40	
25, 10 a. m.	0	0	0	0	0	0	4	35	
29, 3 p. m.	1	2			1	2	4	20	
30, 11 a. m.	0	0	1	2	0	0	3	12	
31, 9 a. m.	1	8	0	0	0	0	4	20	

Faculae were seen at the time of every observation. 1 Approximated.

Mr. H. D. Gowey, of North Lewisburg, Ohio, reports that sun spots were numerous during the entire month.

#### SUNSETS.

The characteristics of the sky as indicative of fair or foul weather for the succeeding twenty-four hours have been observed at all Signal Service stations. Reports from one hundred and fifty-four stations show 4,748 observations to have been made, of which one was reported doubtful; of the remainder, 4,747, there were 3,993, or 84.1 per cent., followed by the expected weather.

#### EARTHQUAKES.

The following is taken from the "New York Herald," of March 18, 1884:

The ship "Elizabeth Nicholson," which arrived at Boston, March 17th, reports that on the night of December 24, 1883, in N. 16° 20', W. 27°, she experienced a severe earthquake shock, which gave the ship a violent shaking up for twenty seconds. The sensation was like that which would be caused by the ship bumping over a hard rocky bottom, or by the swift running out of a chain cable. There was an accompanying sound resembling a distant peal of thunder.

Under date of March 28, 1884, the same paper contains the following:

LONDON, March 27, 1884.—Shocks of earthquake have occurred at Agram and throughout Slavonia. A number of buildings in Deakovar were damaged.

North Platte, Nebraska: a slight shock of earthquake was felt here at 2 p. m. of the 17th.

Saint John's, Newfoundland: an earthquake shock occurred here on the 18th. It was also felt at Harbor Grace, Heart's Content, Brigns Bay, Hart's Harbor, Roberts, and Holyrood. The disturbance at Saint John's was very slight. The shock occurred between 1.30 and 1.45 p. m., the vibration being from north to south.

San Francisco, California: two shocks of earthquake of short duration occurred on the 25th, the direction of vibration being from north to south. The first shock, lasting five seconds, was felt at 4.40 p. m., and the second at 5.17 p. m., duration about two seconds. They were felt along the coast from Santa Cruz to Petaluma, and were considered to have been the severest experienced since 1868. The effect of the shocks in this city varied in different localities. On the made ground, from Montgomery street to the bay, it was most violent, while on the hills only a gentle rocking motion was felt. On San Francisco bay a sudden swell occurred, which was felt by all vessels. Considerable damage was done to the walls of the buildings on Market street. At Oakland and Berkley, on the opposite side of the bay, the shocks were reported to have been more severe than they were in this city.

Milledgeville, Baldwin county, Georgia: a slight shock of earthquake was felt here at 5 a. m. of the 31st.

Mr. J. W. Hammit, voluntary observer at College Hill, Hamilton county, Ohio, reports that three light shocks of earthquake were felt at that place at 1 p. m. of the 31st. The shocks were so slight that the direction of vibration was not determined.

#### MIGRATION OF BIRDS.

**Geese flying northward.**—Point Judith, Rhode Island, 8th, 23d; Portland, Maine, 25th; Hatteras, North Carolina, 30th; Indianola, Texas, 10th; Fort Smith, Arkansas, 2d; Erie, Pennsylvania, 18th; Davenport, Iowa, 13th, 16th; Huron, Dakota, 22d; Fort Scott, Kansas, 17th, 22d; Voluntown, Connecticut, 13th; Vermillion, Dakota, 14th; Webster, Dakota, 26th to 31st; Morrilton, Dakota, 23d; Archer, Florida, 12th; Forsyth, Georgia, 7th; Salina, Kansas, 27th; Edgington, Illinois, 14th; Swanwick, Illinois, 9th, 10th; Guttenberg, Iowa, 27th; Fort Madison, Iowa, 15th, 21st; Monticello, Iowa, 19th; Des Moines, Iowa, 13th; Indianola, Iowa, 21st, 27th; Humboldt, Iowa, 15th, 20th; Manchester, Iowa, 17th, 18th, 19th to 23d; Independence, Kansas, 11th; Yates Centre, Kansas, 12th, 16th; Allison, Kansas, 12th; West Leavenworth, Kansas, 11th; Maud, Kansas, 15th; Emmittsburg, Maryland, 11th; Sandy Springs, Maryland, 25th; Fall River, Massachusetts, 9th; Provincetown, Massachusetts, 14th; Hastings, Minnesota, 23d; Genoa, Nebraska, 12th; Crete, Nebraska, 16th; Clear Creek, Nebraska, 4th, 9th, 12th, 16th, 29th; Penn Yan, New York, 16th; Albany, Oregon, 30th; Barnesville, Texas, 7th; Lancaster, Wisconsin, 22d; Sussex, Wisconsin, 30th; Riley, Illinois, 16th.

**Geese flying southward.**—Fort Myer, Virginia, 12th; Edgington, Illinois, 20th; Mottville, Michigan, 14th; Saint Louis, Missouri, 17th.

**Ducks flying northward.**—Davenport, Iowa, 18th, 21st; Dubuque, Iowa, 27th; Indianola, Texas, 23d; Toledo, Ohio, 22d; Huron, Dakota, 22d; Omaha, Nebraska, 5th; Fort Madison, Iowa, 17th, 18th; Indianola, Iowa, 12th, 16th; Fort Scott, Kansas, 18th, 21st; Humboldt, Iowa, 17th; Manchester, Iowa, 17th, 18th, 19th to 23d; Salina, Kansas, 27th; Yates Centre, Kansas, 5th, 12th, 15th, 19th; Hastings, Minnesota, 22d, 27th; Clear Creek, Nebraska, 4th, 16th, 29th; College Hill, Ohio, 11th; Chambersburg, Pennsylvania, 23d; Sussex, Wisconsin, 16th; Edgington, Illinois, 16th.

**Ducks flying southward.**—Yates Centre, Kansas, 3d; Allison, Kansas, 19th; Sussex, Wisconsin, 21st; Edgington, Illinois, 13th, 15th.

*Cranes flying northward.*—Guttenberg, Iowa, 27th, Independence, Kansas, 31st; Yates Centre, Kansas, 26th; West Leavenworth, Kansas, 17th, 21st; Liberty Hill, Louisiana, 21st; Wickenburg, Arizona, 15th.

*Cranes flying southward.*—Yates Centre, Kansas, 25th.

#### METEORS.

Grand Rapids, Kent county, Michigan: at about 3 a. m. of the 15th, a very brilliant meteorite was observed to pass over the city in a direction southeast by south. It remained in view several seconds, disappearing on the southeastern horizon. The nucleus was in appearance about half the size of a full moon, and resembled in brilliancy an electric light. It was followed by a small tail of a bright red color. Though the moon was shining brightly at the time of the meteor's appearance, it formed a brilliant spectacle. Reports from Kalamazoo are to the effect that a meteor, which was probably the same as the above, was seen at about the same hour, and that it exploded with a loud report some forty miles beyond that village.

Webster, Day county, Dakota: at 7.35 p. m. of the 16th a meteor, apparently the size of "Jupiter," exploded in the northeastern sky at an altitude of about 30°.

Meteors were also observed at the following places:

1st.—Albany, Oregon.

13th.—Crete, Nebraska.

19th and 20th.—Lead Hill, Arkansas.

25th.—Liberty Hill, Louisiana.

27th.—Woodstock, Maryland.

28th.—Lead Hill, Arkansas.

31st.—Rowe, Massachusetts.

#### SNOW SLIDES.

Salt Lake City, Utah: a snow slide occurred at Alta, (about twenty miles southeast of this city,) on the 7th, resulting in the death of twelve persons.

Denver, Colorado: at 6 p. m., of the 10th, a snow slide descended upon Woodstock, Gunnison county, carrying away every building in that village. Seventeen persons were reported to have been buried under the snow. The snowfall in mountain districts of Colorado during the past winter is reported to have been unprecedented. Many mining camps in the southern and western parts of the state have been snow-bound since November. The towns of Durango, Silver and Rico were still blockaded on the 10th, no trains having reached those points for several weeks. Great suffering has been experienced at Breckenridge and Montezuma, in Summit county. In the ravines and gulches of Gunnison county the snow was from fifty to one hundred feet deep.

A snow slide occurred on the Aspen mountain, Colorado, during the night of the 10th–11th, by which three employes of the Vallejo mine were killed.

#### POLAR BANDS.

Lead Hill, Arkansas, 11th.

Los Angeles, California, 7th.

Washington, District of Columbia, 22d.

Archer, Florida, 4th, 6th, 14th, 31st.

Riley, Illinois, 10th, 16th.

Yates Centre, Kansas, 4th, 30th.

Escanaba, Michigan, 25th.

Fort Assinaboine, Montana, 10th.

Clear Creek, Nebraska, 11th, 15th.

Mountainville, New York, 28th.

Charleston, South Carolina, 11th.

Stateburg, South Carolina, 22d.

Rio Grande City, Texas, 4th.

Wytheville, Virginia, 12th, 16th, 23d.

Milwaukee, Wisconsin, 5th.

#### PRAIRIE AND FOREST FIRES.

Fort Smith, Arkansas, 3d, 27th, 28th.

Yankton, Dakota, 23d, 25th, 26th, 30th.

Humboldt, Iowa, 29th, 30th.

Independence, Kansas, 1st to 5th, 8th, 11th, 15th, 17th to 29th.

Dodge City, Kansas, 9th, 10th, 14th.

Clear Creek, Nebraska, 26th.

Red Willow, Nebraska, 11th.

North Platte, Nebraska, 19th, 30th.

Fort Craig, New Mexico, 28th.

Fort Stockton, Texas, 10th.

#### DROUGHT.

Indianola, Texas: on the 1st, farmers from the surrounding counties reported that crops were suffering from the effects of drought.

Rio Grande City, Texas: a severe drought prevailed in this section during the month. On the 17th, stock growers in localities northeastward, reported that the crops were suffering in consequence of drought, and that cattle were dying on account of poor pasturage.

#### ZODIACAL LIGHT.

Prescott, Arizona, 25th.

Webster, Dakota, 1st, 12th, 13th, 15th to 18th, 24th, 26th.

Pensacola, Florida, 19th.

Escanaba, Michigan, 1st, 7th, 13th, 17th, 18th, 26th, 27th.

Variety Mills, Virginia, 8th, 15th, 16th, 20th, 24th, 26th, 27th.

#### SAND STORMS.

Yuma, Arizona, 10th, 23d.

San Carlos, Arizona, 10th.

West Las Animas, Colorado, 10th.

Fort Union, New Mexico, 4th, 5th.

Fort Stanton, New Mexico, 10th.

Fort Stockton, Texas, 24th.

#### ERRATUM.

In the January REVIEW, on page 24, first column, third line from the bottom, under MIRAGE, should read 7 a. m., instead of 7 p. m.

#### NOTES AND EXTRACTS.

The following extract has been taken from the report of the Ohio Meteorological Bureau for March, 1884, under direction of Professor T. C. Mendenhall:

The mean atmospheric pressure for March was in close agreement with that for the same month of last year, being only seven thousandths of an inch greater. The maximum pressure was greater by one-tenth of an inch than that for March, 1883; the minimum was also less, and the range almost exactly the same.

In temperature, the month was more nearly normal than in 1883. During March of last year the range of temperature was great, reaching as low a point as 17° 4 below zero at Wauseon on the 24th, while only two days before a maximum of 75° was recorded at Ironton. The highest temperature reached during the month, this year, was 74° 0, reported from both Logan and Ironton on the 29th and 30th. The lowest was 10° 5 below zero, reported from Sidney on the 4th.

The mean temperature for the month was 37° 5, against 32° 4 for March of last year, and this is still somewhat below the normal temperature for the month, which, from the best information at hand is 38° 2. Compared with last year the mean daily range was nearly two degrees less, and the maximum daily range about 15° less.

The mean precipitation for the month was considerably in excess of that of last year, but not differing very greatly from what may be regarded as the normal amount for March. Quaker City, which reported the maximum rainfall (3.61 inches) in March, 1883, furnishes the maximum for March, 1884, the amount being 6.05 inches. The mean rainfall over the state since the beginning of the current "meteorological year" (beginning November 1, 1883) has been 19.21 inches, which is almost exactly one inch greater than for the same period of last year.

#### STATE SUMMARY OF REPORTS FOR MARCH.

Mean barometer, 30.067 inches.

Highest barometer, 30.518 inches on the 30th, at Wapakoneta.

Lowest barometer, 29.348 inches on the 26th, at Wauseon.

Range of barometer, 1.170 inches.

Mean relative humidity, 79.3 per cent.

Mean temperature, 37° 5.

Highest temperature, 74° 0 on the 29th and 30th, at Logan and Ironton.

Lowest temperature, —10° 5 on the 4th, at Sidney.

Range of temperature, 84° 5.

Mean daily range of temperature, 17° 6.